Puget Sound Energy

Electric Reliability Monitoring and Reporting Plan

In Compliance with WAC 480-100-393

January 2002

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Executive Summary

This report is Puget Sound Energy's ("PSE" or "the Company") Reliability Reporting Plan, required to be filed at the Washington Utilities and Transportation Commission ("WUTC" or "the Commission") according to WAC 480-100-393 Electric Service Reliability Monitoring and Reporting Plan. The following sections outline the information that PSE will be providing in its annual service reliability report to comply with each section of WAC 480-100-393 and WAC 480-100-398 Electric Service Reliability Report. Information contained in the annual report will help the Commission, customers, and other interested parties better understand how service reliability measures change from year to year. PSE cautions against putting too much emphasis on the usefulness of the annual report in determining year-to-year trends pertaining to system performance. Factors such as variation in weather, natural disasters, and normal random variation in events such as third-party damage will all impact year-to-year comparisons of system performance. Assessing trends requires a longer-term perspective than looking for variations between two annual periods, such as comparing ten-year rolling average with a ten year baseline period. Notwithstanding the limited usefulness of using the annual reports to assess year-to-year trends, PSE believes the annual snap-shots provided in the Company's annual reliability report will provide useful information to all interested parties as the data for reasonable trend analysis is accumulated.

Section I—Background

PSE submits the following Reliability Monitoring Plan to help ensure the Commission has the required information about PSE's electric system reliability and assure the Commission Staff that the information reported is accurate and meaningful.

Delivering reliable electrical service is core to PSE's business philosophy. Developing the most appropriate and cost-effective means to meet customer reliability needs is PSE's objective. As mentioned during the proceeding adopting the new rules, PSE experienced 13 reliability-related Commission complaints during the Service Quality Index (SQI) reporting period of October 1999 through March 2000, including storm related incidents, while serving over 900,000 customers. This indicates about one thousandth of one percent of our customers had concerns about the reliability of their service sufficient for the customer to contact the Commission. This information, in combination with PSE's consistent SQI performance, indicates PSE is indeed meeting customer's reliability expectations and needs.

At several of the meetings in the development of this rule, the Commission staff discussed various reliability measurement indices and procedures in the establishment of company practices for measurement of reliability. The Commission staff also explored the justification of differences between utility reliability reporting procedures. Puget Sound Energy (PSE) was a member of the IEEE Task Force IEEE that developed the Trial-Use Guide for Electric Power Distribution Reliability Indices (P1366). The Trial-Use guide identifies useful distribution reliability indices and factors that affect their calculation. PSE actively participated in the development of the IEEE Trial-Use Guide

for Electric Power Distribution Reliability Indices, Approved 10 December 1998 edition. As an active member of the IEEE Task Force PSE believes we follow the intent of the IEEE Trial-Use Guide for Electric Power Distribution Reliability Indices (P1366). This Trial Use Guide was developed with over 75 participants over the course of several years. The guide provides significant latitude, though it is expected that the utilities would follow the intent of the Trial-Use while making the appropriate trade-off between existing business practices, data gathering and the goal to capture distribution outage information.

Definitions and information that will be included in PSE's annual reliability report are based on the principles underlying the IEEE Trial-Use Guide. Conforming to this guide, as much as reasonably feasible, will help to conform PSE's report to newly evolving industry standards.

Section II—Definitions

AMR - Automated Meter Reading system, which is a sophisticated communication network capable of providing the Company with certain information pertaining to sustained outages automatically.

Area of Greatest Concern - An area targeted for specific actions to improve the level of service reliability or quality that is reported in Section V—Areas of Greatest Reliability Concern.

Cause Codes - A list of codes used to identify the Company's best estimation of what caused a Sustained Interruption to occur. The following is the PSE Interruption Causes cause code information in the SAP system:

AO—ACCIDENT OTHER, WITH FIRES
BA—BIRD OR ANIMAL
CP—CAR/POLE ACCIDENT
CR—CUSTOMER REQUEST
DU—DIG UP UNDERGROUND
EF—EQUIPMENT FAILURE
EO—ELECTICAL OVERLOAD
EQ—EARTHQUAKE
FI—FAULTY INSTALLATION
LI—LIGHTNING
OD—OUTSIDE DISTURBANCE;BPA LINES DOWN
OE—OPERATING ERROR
SO—SCHEDULED OUTAGE, WAS WR- WORK REQUIRED
TF—TREE - OFF RIGHT OF WAY
TO—TREE - ON RIGHT OF WAY
UN—UNKNOWN CAUSE (UNK EQUIP INVOLVED ONLY)
VA—VANDALISM

Customer Complaint – When a customer is not satisfied with the resolution or explanation of their concern pertaining to Sustained Interruptions and Power Quality where, after investigation by the Company, the cause of the concern is found to be on the Company's energy delivery system.

Customer Count - The number of meters out-of-service during the sustained interruption.

Customer Inquiry - An event whereby a customer contacts the Company to report a Sustained Interruption or Power Quality issue or concern.

Duration of Sustained Interruption - The period (measured in minutes, or hours or days) beginning when the Company is first informed the service to a customer has been interrupted and ending when the problem causing the interruption has been resolved and the line has been reenergized. An interruption may require step restoration tracking to provide reliable index calculation. As an example, two trees could be down, one taking out a major feeder on a main street affecting numerous customers, another down the line in a side street, affecting only a few customers off that major feeder. When the major line is restored and service to most customers is resumed, it is possible that the second tree will prevent resumption of service to the smaller group of customers. The Sustained Interruption associated with the second tree is treated as a separate incident for reporting and tracking purposes.

Major Event - A catastrophic event that exceeds design limits of the electric power system and is characterized by more than 5% of the customers out of service during a 24-hour period.

Measles Plot - A measles plot is a localized area of reliability concerns plotted on a geographic area map. The "Measles" plot area may be smaller or larger than an area of concern.

Outage - The state of a component when it is not available to perform its intended function due to some event directly associated with that component. Notes: 1. An outage may or may not cause an interruption of service to customers, depending on system configuration. 2. This definition derives from transmission and distribution applications and does not apply to generation outages.

Power Quality - There are no industry standards that are broad enough to be able to define power quality or how and when to measure it. For purposes of this rule, power quality includes all other physical characteristics of electrical service except for Sustained Interruptions, including but not limited to momentary outages, voltage sags, voltage flicker, harmonics and voltage spikes, etc.

SAIDI - System Average Interruption Duration Index. This index is commonly referred to as customer minutes of interruption or customer hours, and is designed to provide information about the average time the customers are interrupted. SAIDI will be calculated according to the following:

$$\text{SAIDI} = \frac{\sum \text{Duration of Sustained Interruptions (in minutes) experienced by customers}}{\text{Total number of customers served}}$$

SAIFI - System Average interruption frequency index (sustained interruptions). This index is designed to give information about the average frequency of sustained interruptions per customers over a predefined area. SAIFI will be calculated according to the following:

$$\text{SAIFI} = \frac{\text{Total number of Sustained Interruptions experienced by customers}}{\text{Total number of customer served}}$$

Step restoration - The restoration of service to blocks of customers in an area until the entire area or feeder is restored.

Sustained Interruption - Any interruption not classified as a momentary event. PSE records interruptions longer than 1 minute.

Section III—System Level Reliability

The following information will be included in the System Level Reliability section in each annual report:

A. SAIDI
B. SAIFI
C. Customer Complaints related to Sustained Interruptions.
D. Customer Complaints related to Major Events.
E. Cause Code report, showing the causes of Sustained Interruptions.

Section IV—Subsystem Reliability

The following information will be included in the Subsystem Level Reliability section in each annual report by County:

A. SAIDI
B. SAIFI
C. Customer Complaints related to sustained interruptions in each county.
D. Cause Code report, showing the causes of Sustained Interruptions.

Section V—Areas of Greatest Concern

This section of the annual report will include information on specific geographic areas the Company will be targeting for specific actions to enhance the level of service reliability in the area. Managing an electrical delivery system is too complex to create a set of criteria for when the Company believes targeted actions are necessary. Therefore, the following information will be reported on each of these areas:

A. Identification of each Area of Greatest Concern (a.k.a., measles).
B. Measle Plot showing geographically the location of Areas of Greatest Concern.
C. An explanation of why the Company classifies the area it as an Area of Greatest Concern.
D. Explanation of the specific actions the Company plans to take in each Area of Greatest Concern to improve the service in each area during the coming year.

E. Revisit the Areas of Greatest Concern and action item list from the previous plan and report if the planned actions were implemented, or if another action was taken (including no action) with an explanation of why something else was done.

Section VI—Data Collection—Methods and Issues

This section explains how PSE will collect the underlying data for each annual report, for the measures described above. Each annual report will include a section on data collection methods and issues. The section will include an explanation of how the various data were collected. Changes in methods from prior reporting periods will be highlighted and the impact of the new method on data accuracy will be discussed in each annual report.

Methods for Identifying a Sustained Interruption/When Interruption Duration Measurement Begins

A. Customer call to the Company's customer access center, either through the automated voice response unit or talking with a customer representative.
B. Customer call to a PSE employee other than through the customer access center.
C. Automated system information from the Company's AMR system.
D. Possible Causes of Data Inconsistencies:
    1. If service to a customer that previously was affected by a service interruption remains out after the problem suspected to have caused the interruption has been corrected, a follow-up call from the customer may be reported as a new incident. This can especially be the case using Step Restoration.
    2. Customers may call to report a Sustained Interruption that was caused by their own equipment and not shared by other customers. If the customer's power has been restored before crews arrive to investigate, the incident may still be reported as a sustained interruption.
    3. It is likely, as with any computer information system, that the AMR reports may provide reports on some outages that were not verified. The number of such false reads, if any, have not been established.
    4. Data entry mistakes can create inconsistencies.
    5. Major storm event will have an impact on data accuracy. In general, data accuracy is inversely proportional to the magnitude of the storm event.

Methods to Specify When the Duration of a Sustained Interruption Ends

A. Service personnel will log the time when the problem causing the outage has been resolved.
B. Possible Causes of Data Inconsistencies:
    1. There may be multiple layers of issues contributing to a Sustained Interruption for a specific customer as described in the definition of Duration of Sustained Interruption.
    2. Data entry errors can affect the accuracy of the information.

Recording Cause Codes

A. Outage cause codes are reported by the PSE service personnel responding to the outage location.
B. Possible Causes of Data Inconsistencies.
    1. Major storm event will have an impact on data accuracy. In general, data accuracy is inversely proportional to the magnitude of the storm event.
    2. The cause of the outage and the location of the protective device may be a significant distance. Pinpointing the exact location of the outage and the cause is secondary to the outage restoration effort.
    3. Tracking the distribution feeder to find temporary or momentary contacts with the distribution system is difficult.
    4. A series of outages effecting a group or groups of customers at the same time or approximate times with several causes are difficult to capture.
    5. Determining the differences between different cause codes is difficult in cross-country terrain and in the darkness.

Recording and Tracking Customer Complaints

A. Initially, customer complaints will be tabulated manually by engineering personnel that follow-up customer inquiries related to Power Quality and Sustained Interruptions. The Company anticipates implementing modest changes to its information tracking system in the near future to automate tabulation in order to improve the accuracy of Customer Complaint tracking.
B. Possible Causes of Data Inconsistencies.
    1. Using the manual tabulation process, it is possible that a complaint my not be identified as such due to data entry and tabulation errors. PSE will minimize this inaccuracy by having the team involved with responding to inquiries, who are most knowledgeable about the specific situation, track Customer Complaints.
    2. When PSE implements the revisions to its information tracking system, sources of inaccuracy will include improper data entry. PSE will minimize this inaccuracy by having the team involved with responding to inquiries, who are most knowledgeable about the specific situation, track Customer Complaints, which will help catch errors in data entry.
    3. High volumes of Customer Inquiries, during storms for example, may increase the likelihood of data entry errors, leading to less accurate information.

Section VII—Baseline and Annual Reporting Periods

Baseline Data Reliability Statistics

As noted above in the Executive Summary section, PSE cautions the Commission regarding the usefulness of using system performance data or information to attempt to assess year-to-year trends. Such trend analysis may not prove useful. Therefore, there is limited usefulness in designating one specific year's information as a "baseline." Rather, the Company will develop a long-term baseline using information provided in the annual reports. The Company will accumulate ten years of data, then compare the ten year rolling average updated for the current year and dropping the first year with the ten-year average baseline. Prior to having the ten-year average baseline, the Company will provide data for each previous year, to allow interested parties to conveniently access all the information available up to that time period.

Timing of Annual Report Filings

PSE will be reporting data and information on a calendar year basis. The Company will be prepared to implement all the internal processes necessary to collect the information for the annual report by the beginning of 2002. Thus, the earliest full 12-month data that will be available will be for the calendar year 2002. Additional time will be required to finalize and analyze all the relevant information and prepare the annual report after the end of the calendar year. Thus, the Company's annual reports will be filed with the Commission no later than the end of March for the preceding calendar year, beginning with a filing in March of 2003 for the calendar year of 2002.